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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/609,236

06/26/2003

Venkat Selvamanickam

1014-SP106

7733

34456

7590

06/30/2009

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EXAMINER

KACKAR, RAM N

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

06/30/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/609,236	Applicant(s) SELVAMANICKAM ET AL.	
	Examiner Ram N. Kackar	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 6/2/2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,7-11 and 26-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,7-11 and 26-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
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| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 2, 7-11 and 26-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lijima et al (2001/0006042) in view of Vaidya et al (US 5076203) and further in view of Lue et al (US 6667527).**

Lijima et al disclose a process for cooling and positioning a translating substrate (tape like) which could be comprise metal like nickel (Paragraph 59) in a deposition chamber for vacuum deposition (abstract and Fig 3), gas inlet (38), source of deposition material (36), means of delivering the deposition material (ion beam -38), means of translating a substrate (24,25), means of positioning the substrate so that deposition material impinges on the substrate (23) whereas the substrate positioning means contains means to cool the substrate. Lijima et al further teach that the process is used for making a buffer layer of yttrium stabilized zirconia (YSZ) or MgO for a superconducting film (Abstract and paragraph 71) using ion assist (39).

Further Lijima et al teach that FWHM (full width at half maximum) is the measure of biaxial texture (*indicator of crystal orientation- Paragraph 99*) and that it could be minimum at an incidence angle of 50-60 degrees (paragraph 16, 87 and 99). Further Lijima et al disclose various parameters affecting FWHM and disclose it to be below 10 degrees (Fig 13).

Lijima et al fails to teach that substrate positioning means contains equally spaced internal gaseous coolant delivery channels and additional liquid coolant channels and specific size of gas orifices.

Vaidya et al disclose a process for cooling and positioning a translating substrate in a deposition chamber for vacuum deposition (Col 1 lines 8-11, Col 2 lines 1-25), gas inlet (Fig 7- Fig 10), means of delivering the deposition material (electron –beam heater (Col 3 line 35), means of translating a substrate (Fig 6-22) from 0-90 meters per min (Abstract), curved means of positioning the substrate so that deposition material impinges on the substrate (23) whereas the substrate positioning means contains internal liquid coolant channels (23a and 23b) and internal gaseous coolant delivery channels (Fig 6-30, Fig 7-Fig10 and Col 6 lines 5-68) which could use oxygen or argon to allow the temperature from 0° C upwards.

As discussed above Vaidya et al disclose that substrate positioning means contains internal liquid coolant channels (23a and 23b) and internal gaseous coolant delivery channels from behind the support either through porous fixed support (Fig 7- Fig10 and Col 6 lines 5-20) or through an enclosed cavity (Fig 7-10 and Col 6 lines 44-68). Regarding the limitation of equal spaced openings Vaidya et al disclose equal spaced channels through porous medium as well as behind it (Fig 7-44 and Fig 9-63) and are oriented in away to make the gas at high pressure flow perpendicularly at the back of the translating substrate.

Furthermore, Vaidya et al teach that these features could be combined (Col 6 lines 44-68) and teach that the injection holes could be 1.5 mm diameter at 15 mm pitch (Col 4 lines 3-9).

Vaidya et al teach that the gaseous delivery behind the web substrate reduces friction in addition to provide cooling by conduction of heat between the substrate and the cooled support (Col 4 lines 37-55).

Therefore having gaseous delivery behind the web substrate to reduces friction in addition to provide cooling by conduction and convection means and provision of liquid coolant channels in IBAD apparatus would have been obvious to one of ordinary skill in the art at the time of invention in order to remove the heat from the positioning means and reduce friction to enable higher web speed.

Since the hole diameter and spacing determine the amount of gas and its distribution behind the substrate which affects amount and uniformity of cooling it would have been obvious for one of ordinary skill in the art at the time of invention to replace the porous outlets in the support by spaced holes to distribute sufficient gas behind the tape substrate for optimum heat transfer and reduced friction.

Regarding the gas channels extending to the first surface and being hollow and open along an entirety of said length, Fig 7-Fig 10 show gas channels, which extend to the first surface through the pores in the porous material since they allow the flow to reach the first surface. It is inherent that the pores work because they are connected to each other continuously up to the surface and they must be hollow to allow the flow to take place.

Regarding the limitation “and extend to respective openings at positions spaced apart from each other at a first surface of the substrate block where the substrate block contacts the translating substrate, the openings are equally spaced apart with respect to each other along a second direction perpendicular to the first direction” it is noted that pores and tubular channels

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are equivalent and function in the same way. Further, since the pores are uniformly distributed, the pores and gas channels supplying gas to the porous material function to distribute coolant gas uniformly to the moving substrate 45.

It is agreed that the gas openings distribution through salient tubes (316) as disclosed in Fig 3A and its section in Fig 3B does not look exactly like the pores as in Fig 7-10 in Vaidya et al. However, pores are tubelets spread uniformly and being open perpendicular to the block and the movable substrate. These tubelets therefore meet the definition of delivery channels spread uniformly spaced apart in two dimensions as required by the claims. Further, they work exactly like the delivery channels in Fig 3A and 3B of the specification.

Further Lijma et al teach control of substrate temperature and teach that the deposition properties are related to substrate temperature and further disclose sensor to detect substrate temperature.

Lijima et al however do not disclose temperature sensor being optical pyrometer connected to a sapphire wave guide.

Lue et al disclose optical pyrometer connected to a wave guide which could be sapphire (See for example Col 3 lines 7-26) and teach that sapphire could work in caustic environment.

Therefore, it would have been obvious to have a pyrometer temperature sensor with sapphire wave guide for ease of positioning and capability to work in caustic environment

Regarding the radius of curvature in claims 26 and 33, it is noted that the shape and size of the cooling block as in Vaidya (Fig 6) is determined by such design factors as the distance, location and other parameters of wind roll 24 and unwind roll 22, speed of the tape and rate of

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deposition etc. Vaidya shows gentle curvature at both sides of the cooling block 23 in conformity with web travel. Parameters like this are optimizable parameters and held to be obvious.

3. Claims 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lijima et al (2001/0006042) in view of Vaidya et al (US 5076203) and further in view of Lue et al (US 6667527) as applied to claims 2, 7-11 and 26-32 and further in view of Chiang et al (US 20020144786) .

Lijima et al in view of Vaidya et al and Lue et al as disclosed above do not explicitly disclose temperature control in response to measured temperature.

Chiang et al disclose temperature control in response to measured temperature by controlling gas and liquid coolant through the interface of substrate and holder (Paras. 85-86).

Therefore having temperature controller for controlling cooling gas flow in response to temperature sensor would have been obvious for one of ordinary skill in the art at the time of invention.

4. Claims 2, 7-11 and 26-33 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Lijima et al (2001/0006042) in view of Vaidya et al (US 5076203), Lue et al (US 6667527) and Chiang et al and further in view of John Madocks (US 7025833).

Lijima et al in view of Vaidya et al, Lue et al and Chiang is disclosed above.

Still further, a similar arrangement for web cooling is disclosed by John Madocks where gas escapes between the back of the web and chill drum (Fig 3-14 46, Abstract and description).

Therefore it would be obvious to have hollow gaseous delivery channels in place of porous channels as being equivalent.

Response to Arguments

Applicant's arguments filed 4/27/2009 have been fully considered but they are not persuasive.

Applicant argues that Iijima et al, Vaidya et al or Madocks do not disclose either a radius of curvature of about 20 feet, or a sapphire wave guide and pyrometer for measuring the temperature of the substrate.

These new limitations are addressed above in the main body of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N. Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571 272 1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ram N Kackar/
Primary Examiner, Art Unit 1792